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Indian Standard

SPECIFICATION FOR INSULATING MATERIALS BASED ON BUILT-UP MICA OR TREATED MICA PAPER

PART III SPECIFICATIONS FOR INDIVIDUAL MATERIALS

Section 4 Rigid Mica Materials for Heating Equipment

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Section 4 Rigid Mica Materials for Heating Equipment

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Indian Standard

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PART III SPECIFICATIONS FOR INDIVIDUAL MATERIALS

Section 4 Rigid Mica Materials for Heating Equipment

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 20 October 1982, after the draft finalized by the Solid Electrical Insulating Materials Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard deals with built-up mica or treated mica paper for use in electrical equipment. It consists of the following three parts:

Part I Definitions and general requirements,

Part II Methods of test, and

Part III Specifications for individual materials.

0.3 This standard (Part III/Sec 4) covers requirements for rigid mica materials for heating equipments.

0.4 In preparing this standard, assistance has been derived from IEC Doc:15C (Central Office) 135 Draft specification for insulating materials based on mica, Part 3 Specifications for individual materials, Sheet 10 Specification for rigid mica materials for heating equipment issued by International Electrotechnical Commission.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard (Part III/Sec 4) applies to several types of rigid mica materials based on mica splitting or mica paper for application in electrical heating equipment. These products may be made from muscovite or phlogopite mica with suitable bonding medium.

1.2 The binder may be totally driven off in service, giving a material which needs to be supported or may remain totally or partially, giving a self supporting material; in this case, this binder must have the necessary resistance to the operating temperature.

2. GENERAL REQUIREMENTS

2.1 The material as supplied shall be of uniform hardness, free from soft patches and foreign matter.

2.2 The grade and visual characteristics of the splitting as well as the nature of the mica paper and the bonding medium shall be agreed between the supplier and the purchaser.

3. DETECTION OF DEFECTS AND CONDUCTING PARTICLES IN SHEET

3.1 The method of test and number of defects shall be as agreed between the supplier and the purchaser.

4. THICKNESS

4.1 Rigid mica material shall be supplied either in sheet or strip or flat, of minimum thickness 0·30 mm (mica splitting) and 0·20 mm (mica paper).

4.1.1 The thickness of the material as received shall be measured with an apparatus in accordance with **2.1** of Part II of this standard.

4.1.2 The thickness (central value in millimetres) shall not depart from the nominal thickness by more than the tolerances given in Tables 1 and 2 and individual measurements shall not defer by more than the value given in Tables 1 and 2.

5. OTHER REQUIREMENTS

5.1 Further requirements of mica materials for heating equipment are given in Table 3.

TABLE 1 THICKNESS TOLERANCE FOR MATERIALS BASED ON MICA SPLITTINGS

(*Clause* 4.1.2)

All dimensions in millimetres.

Nominal Thickness	Tolerance for	
	Central Value	Individual Measurement
(1)	(2)	(3)
0·30	±0·06	+0·20 −0·13
0·40	±0·06	+0·20 −0·15
0·50	±0·07	+0·25 −0·15
0·60	±0·08	+0·25 −0·15
0·80	±0·10	+0·27 −0·17
1·00	±0·12	+0·30 −0·20
Over 1·00	No tolerances specified	

NOTE — For intermediate thicknesses the tolerances shall be of next higher nominal thickness.

TABLE 2 THICKNESS TOLERANCE FOR MATERIALS BASED ON MICA PAPERS

(*Clause* 4.1.2)

All dimensions in millimetres.

Nominal Thickness	Tolerances for	
	Central Value	Individual Measurement
(1)	(2)	(3)
0·20	±0·04	±0·05
0·30	±0·04	±0·05
0·40	±0·04	±0·07
0·50	±0·05	±0·07
0·60	±0·05	±0·07
0·80	±0·06	±0·08
1·00	±0·07	±0·10
Over 1·00	—	±10 percent

NOTE — For intermediate thickness the tolerances shall be of next higher nominal thickness.

TABLE 3 REQUIREMENTS OF MATERIALS BASED ON BUILT-UP MICA FOR HEATING EQUIPMENT

(*Clause* 5.1)

SL No.	TYPE	DESCRIPTION	MAXIMUM BINDER CONTENT PERCENT	MINIMUM ELECTRIC STRENGTH kV/mm	DENSITY g/cm
(1)	(2)	(3)	(4)	(5)	(6)
i)	HS1	Muscovite splittings with organic binder	5·0	7	1·9-2·5
ii)	HS2	Phlogopite splittings with organic binder	5·0	7	2·0-2·6
iii)	HS3	Muscovite splittings with silico resin binder	10·0	7	1·8-2·4
iv)	HP4	Mica paper with organic binder	6·0	7	2·0-2·4
v)	HP5	Mica paper with silicon resin binder	12	7	1·6-2·1
vi)	HP6	Mica paper with inorganic binder	—	7	—
	Relevant clause number of Part II of this standard		**3.4** for HS1, HS2, HP4 and HP6 **3.7** for HS3 and HP5	8	

6. FLEXURAL STRENGTH — Under consideration.

7. SUPPLY CONDITIONS

7.1 The rigid mica material for heating equipment shall be generally supplied in one of the following shapes:

a) In sheets approximately 1 m long and 0·5 to 1 m wide,

b) In strips not more than 200 mm wide cut from sheets, and

c) Flat pieces cut to the dimensions specified by the purchaser.

8. MARKING

8.1 Each packing shall be marked with the following information:

a) A reference to this Indian Standard for example Ref IS : 9299 (Part III/Sec 4),

b) Type of product,

c) Manufacturer's name or trade-mark,

d) Nominal thickness and dimensions, and

e) Number of pieces and weight in each package.

8.2 The packing may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

9. SAMPLING SCHEME AND CRITERIA FOR ACCEPTANCE

9.1 A recommended sampling scheme and criteria for the acceptance of lots for various lot sizes is given in Appendix A.

APPENDIX A

(*Clause* 9.1)

SAMPLING PROCEDURE FOR RIGID MICA MATERIALS FOR HEATING EQUIPMENT

A-1. SCALE OF SAMPLING

A-1.1 Lot — In a consignment, all the rigid mica sheets of the same type and size manufactured from the same material under similar conditions of production, shall be grouped together to constitute a lot.

A-1.2 The number of mica sheets to be selected from each lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 4.

A-1.2.1 These mica sheets shall be selected from the lot at random. In order to ensure the randomness of selection, procedures given in IS : 4905-1968* may be followed.

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*Methods for random sampling.

TABLE 4 SAMPLE SIZE AND ACCEPTANCE NUMBER

(*Clauses* A-1.2, A-2.1 *and* A-2.2)

LOT SIZE	FOR THICKNESS AND DENSITY		FOR BINDER CONTENT AND ELECTRIC STRENGTH SAMPLE SIZE
	Sample Size	Acceptance Number	
(1)	(2)	(3)	(4)
Up to 50	8	0	2
51 ,, 100	13	0	2
101 ,, 300	20	1	3
301 ,, 500	32	2	3
501 and above	50	3	5

A-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

A-2.1 The mica sheets as selected according to col 1 and 2 of Table 4 shall be subjected for thickness and density requirements. A sheet failing to meet either of the requirements, shall be termed as 'defective'. The lot shall be considered as conforming to these requirements if the number of defectives found in the sample is less than or equal to the corresponding acceptance number given in col 3 of Table 4; otherwise the lot shall be rejected without further testing.

A-2.2 The lot which has been found as conforming to the above requirements, shall then be tested for binder content and electric strength. For this purpose, the sample size is given in col 4 of Table 4. The lot shall be considered as conforming to these requirements if no defective is found in the sample.

A-2.3 The lot shall be considered as conforming to the requirements of the standard if **A-2.1** and **A-2.2** are satisfied.